

Solve the triangles.

1.  $A = 40^\circ$ ,  $B = 30^\circ$ , and  $b = 10$

2.  $a = 5$ ,  $b = 9$ ,  $c = 7$

3.  $A = 55^\circ$ ,  $b = 12$ ,  $c = 7$

4.  $A = 36^\circ$ ,  $a = 2$ ,  $b = 7$

5.  $C = 36^\circ$ ,  $a = 17$ ,  $c = 16$

6.  $A = 36^\circ$ ,  $B = 48^\circ$ ,  $c = 13.5$

Find the area with the given information.

7.  $B = 42^\circ$ ,  $c = 18$ ,  $a = 10$

8.  $a = 4$ ,  $b = 5$ ,  $c = 8$

9. Two airplanes flying together in formation take off in different directions. One flies due east at 350 mph, and the other flies  $N45^\circ E$  at 380 mph. How far apart are the two airplanes 2 hours after they separate, assuming that they fly at the same altitude?

10. Two observers spot a hot air balloon. Person A is due west of person B. The bearing from person A to the balloon is  $N57^\circ E$  and the bearing from person B to the balloon is  $N53^\circ W$ . If the two people are 1.75 miles apart, how high above the ground is the balloon?



11-13 A) Find the component form, B) Find the linear form, and C) Find the magnitude.

11. Initial (4,2) terminal (7,1)

12. From (0,-2) to (3,6)

13. Initial (-6,4) terminal(0,1)

14. Find a unit vector in the same direction of vector  $\langle 8, -20 \rangle$ .

15. Find the vector  $\mathbf{v}$  with the given magnitude and the same direction as  $\mathbf{u}$ .  $\|\mathbf{v}\| = 8, \mathbf{u} = \langle 4, -4 \rangle$

16-18, Find the magnitude and direction angle of the vector  $\mathbf{v}$ .

16.  $\mathbf{v} = 5(\cos 30^\circ \mathbf{i} + \sin 30^\circ \mathbf{j})$

17.  $\mathbf{v} = 6\mathbf{i} - 6\mathbf{j}$

18.  $\mathbf{v} = 12\mathbf{i} + 15\mathbf{j}$

19-21, Find the component form of  $\mathbf{v}$  given its magnitude and the angle it makes with the positive x-axis.

19.  $\|\mathbf{v}\| = 3, \theta = 45^\circ$

20.  $\|\mathbf{v}\| = 3\sqrt{2}, \theta = 150^\circ$

21.  $\|\mathbf{v}\| = 3,$   
 $\mathbf{v}$  in the direction of  $\mathbf{i} + 3\mathbf{j}$

22. Use the law of Cosines to find the angle between the vectors. Assume the angle is between  $0^\circ$  and  $180^\circ$ .  
Hint draw a picture.  $\mathbf{v} = \mathbf{i} + \mathbf{j}, \mathbf{w} = 2\mathbf{i} - 2\mathbf{j}$